

Advanced Oxygen Evolution Catalyst for Electrolyzer Energy Storage for Lunar Surface Systems, Phase I

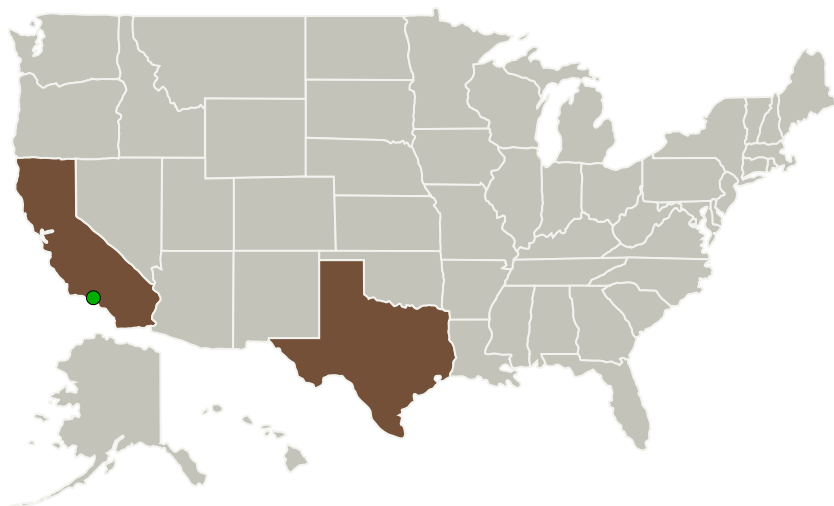
Completed Technology Project (2010 - 2010)



Project Introduction

Future NASA lunar missions will require a high efficiency, lightweight, long life, maintenance-free water electrolyzer for energy storage. Anodic oxygen evolution reaction (OER) is the limiting step in water electrolysis to achieve high efficiency and durability for current electrolyzer technology. Current best candidates for OER catalysts comprising of iridium and ruthenium oxides still suffer from high activation overpotential and incur performance losses in the electrolyzer due to non-optimized microstructural properties. In the present proposal, Lynntech proposes an advancement of its proprietary OER catalyst technology through optimization in microstructure and composition of mixed oxides of iridium and ruthenium. Lynntech's optimized catalyst will exhibit lesser overpotentials due to enhanced uniform nanophase properties of electrical conductivity, hydrophilicity and high surface area. In addition, surface modification of the catalyst is proposed to improve the kinetics of the OER reaction at lower current densities and also to improve the stability of the catalyst towards high potential operation during anodic OER. With its present OER catalyst already achieving less than 1.44 V at 200 mA/cm² at 90 °C and stable operation even at 2.05 V electrolyzer potentials, Lynntech plans to achieve even lower potentials at 200 mA/cm² with the proposed advancement of technology.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Lynntech, Inc.	Lead Organization	Industry	College Station, Texas
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	Texas

Project Transitions

▶ **January 2010:** Project Start

✓ **July 2010:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140649>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Lynntech, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

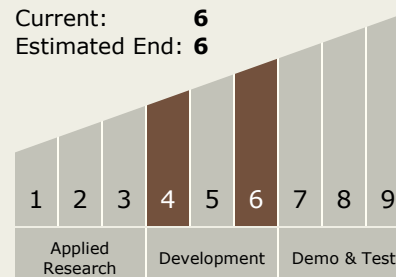
Carlos Torrez

Principal Investigator:

Alan Cisar

Technology Maturity (TRL)

Start: 4
Current: 6
Estimated End: 6



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Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.2 Energy Storage
 - └ TX03.2.2 Electrochemical: Fuel Cells

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System